

# **2001 MNA Work Plan**

## **Tables 1 and 2 (Rev. 2)**

---



**L.E. Carpenter & Company**  
**Monitored Natural Attenuation Workplan May 2001**  
**Table 1 - Data Quality Objectives and Well Selection Criteria (Rev. 2)**

MW-19/HOTSPOT 1 AOC (9)	
Well	Objective
MW-19	Establish baseline dissolved COC and MNA parameter concentrations in the MW19/HS1 former source area.
MW-19-1	Establish baseline dissolved COC and MNA parameter concentrations in the MW19/HS1 former source area.
MW-19-2	Establish baseline dissolved COC and MNA parameter concentrations cross gradient of the MW19/HS1 former source area.
MW-19-5	Establish baseline downgradient dissolved COC and MNA parameter concentrations.
MW-19-6	Establish baseline downgradient dissolved COC and MNA parameter concentrations.
MW-19-7	Establish baseline downgradient dissolved COC and MNA parameter concentrations.
MW-19-8	Establish baseline downgradient dissolved COC and MNA parameter concentrations.
MW-19-9D	Establish baseline dissolved COC concentrations at Ross Street regional interceptor sewer line, and vertical gradient evaluation.
MW-19-10	Establish baseline downgradient dissolved COC and MNA parameter concentrations
MW-19-11	Establish baseline downgradient dissolved COC and MNA parameter concentrations

COCs = Contaminants of Concern: benzene, toluene, ethylbenzene, xylenes, and bis (2-ethyl hexyl) phthalate (DEHP)

AOC = Area of Concern

MNA = Monitored Natural Attenuation

**Note(s):**

1. MW-19/Hot Spot 1 Area of Concern (AOC) is located in the northwestern portion of the LEC site; at the intersection of N. Main Street and Ross Street. In lieu of abandoning the majority of the well network in preparation for the Source Reduction Remedial Project, the wells that comprise the MW19/Hot Spot 1 AOC network are the ONLY sample locations from which groundwater quality and MNA parameters will be collected in 2005. Additional wells will be added to the MNA monitoring protocol once their locations have been approved by NJDEP, and the installation and surveying has been performed.

**L.E. Carpenter & Company**  
**Monitored Natural Attenuation Workplan May 2001**  
**Table 2 – Natural Attenuation Analysis Parameters (Rev. 2)**

FIELD PARAMETERS	METHOD/EQUIPMENT	FREQUENCY
Dissolved oxygen (DO)	360.1 <sup>(2)</sup> /Probe/Hach Kit	Quarterly
Redox potential (Eh)	<sup>(4)</sup> Redox electrode	Quarterly
pH	150.1 <sup>(2)</sup> /pH electrode	Quarterly
Temperature	From conductivity probe	Quarterly
Turbidity	Turbidimeter	Quarterly
Specific Conductance	120.1 <sup>(2)</sup> /Electrical conductivity meter	Quarterly
Ferrous iron	Hach kit; Method 8146	Quarterly
Carbon Dioxide (CO <sub>2</sub> )	Hach kit	Quarterly
Alkalinity (total)	Hach kit	Quarterly
Depth to water <sup>(5)</sup>	Electric tape/Water Level Indicator	Quarterly
LABORATORY PARAMETERS	METHOD	FREQUENCY
Benzene	602 <sup>(1)</sup>	Quarterly
Toluene	602 <sup>(1)</sup>	Quarterly
Ethylbenzene	602 <sup>(1)</sup>	Quarterly
Xylenes	602 <sup>(1)</sup>	Quarterly
DEHP	625 <sup>(1)</sup>	Quarterly
Ammonia Nitrogen (N)	350.3 <sup>(2)</sup>	Quarterly
Nitrate Nitrogen (N)	353.2 or 4110B <sup>(2)(4)</sup>	Quarterly
Sulfate	375.4 or 4110B <sup>(2)(4)</sup>	Quarterly
Heterotrophic Plate Count	9215B <sup>(4)</sup>	Quarterly
Methane	3810 <sup>(3)</sup>	Quarterly
Total Suspended Solids (TSS)	160.2 <sup>(1)</sup>	Quarterly
Total Dissolved Solids(TDS)	160.1 <sup>(1)</sup>	Quarterly
Phosphorus	365.2 <sup>(2)</sup>	Quarterly

**Notes:**

- (1) Federal Register 40 CFR Part 136, Vol. 49, No. 209, Test Parameters for the Analysis of Pollutants.
- (2) USEPA 300/4-79-020 Methods for Chemical Analysis of Water and Waste.
- (3) SW-846, Test Methods for Evaluating Solid Waste, Physical and Chemical Methods, U.S. EPA, 3<sup>rd</sup> Edition, 1986.
- (4) Standard Methods for the Examination of Water and Wastewater, 20<sup>th</sup> Edition, 1998.
- (5) All wells listed on Table 1 will be measured before sampling begins.

**2001 QAPP  
Tables 1 thru 4 (Rev. 2)**

---

**L.E. Carpenter & Company**  
**Quality Assurance Project Plan (QAPP) May 2001**  
**Table 1 – Field and Laboratory Analyte List (Rev. 2)**

<b>FIELD METHODOLOGIES</b>		<b>ANALYTES</b>
Purge Stability using a micro purge cell, probe and electrodes		DO, Eh, pH, Temperature, Turbidity, Specific Conductance
Natural Attenuation criteria using a Hach field kit		Ferrous Iron, CO <sub>2</sub> , Alkalinity
<b>LABORATORY METHODOLOGIES</b>		<b>ANALYTES</b>
Contaminants of Concern (COC)	Organics	Benzene, Toluene, Ethylbenzene, Xylene (BTEX) bis (2-ethylhexyl) phthalate (DEHP)
	Anions	Sulfate, Nitrate-N
Natural Attenuation Criteria	Cations	Ammonia-N, Phosphorus
	Other	Heterotrophic Plate Count, TSS, TDS
	Breakdown gases	Methane

**L.E. Carpenter & Company**  
**Quality Assurance Project Plan (QAPP) May 2001**  
**Table 2 – Water Sample Containers, Preservatives, and Holding Times (Rev. 2)**

PARAMETER	CONTAINER(S)	MINIMUM SAMPLE VOLUME	FIELD PRESERVATION METHOD	HOLDING TIME <sup>(1)</sup>
Volatile organics ( <i>i.e.</i> , BTEX)	3 x 40 mL glass VOA vials with Teflon® <sup>(2)</sup> septum	1 x 40 mL VOA vial	Cool to 4°C, add HCl to pH < 2; protect from light	14 days (sample should remain on-site less than 24 hours)
Semivolatile organics ( <i>i.e.</i> , DEHP)	1 x 1,000 mL amber bottle <sup>(4)</sup>	1,000 mL	Cool to 4°C	7 days to extraction 40 days from extraction to analysis
Methane	2 x 40 mL VOA vials with Teflon® septum <sup>(2)</sup>	1 x 40 mL VOA vial	Cool to 4°C; protect from light; may be preserved with HCl to pH < 2	7 days if unpreserved 14 days if preserved
Phosphorus	Use an aliquot from the alkalinity bottle	100 mL	Cool to 4°C	28 days
Sulfate	Use an aliquot from the alkalinity bottle	100 mL	Cool to 4°C	28 days
Ammonia-N	1 x 1000 mL high-density polyethylene bottle <sup>(3)</sup>	100 mL	Cool to 4°C, add H <sub>2</sub> SO <sub>4</sub> to pH < 2	28 days
Nitrate-N	1 x 250 mL high-density polyethylene bottle <sup>(3)</sup>	100 mL	Cool to 4°C, add H <sub>2</sub> SO <sub>4</sub> to pH < 2	28 days
Temperature, Eh, pH, Specific Conductivity, Dissolved Oxygen, Ferrous Iron, Turbidity, alkalinity, CO <sub>2</sub>	--	--	--	Immediately after sample collected
Heterotrophic Plate Count	120 mL sterile plastic	10 mL	Cool to 4°C, add Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	24-hours
TSS	250 mL G/P	250 ml	Cool to 4°C	7 days
TDS	250 mL G/P	250 ml	Cool to 4°C	7 days

**NOTES**

(1) Starting from time of sample collection.

(2) Collect three extra containers for Matrix Spike/Matrix Spike Duplicate (MS/MSD) samples.

(3) Collect one extra container for sample spike and duplicate analyses.

(4) Collect two extra containers for MS/MSD samples.

(5) QA/QC Sampling: 1 blind duplicate (all analytes); 1 atmospheric blank (all analytes); Trip Blank (BTEX only) @ 1 per cooler (approx 4 TBs/event); Rinsate Blank (all analytes);

**L.E. Carpenter & Company**  
**Quality Assurance Project Plan (QAPP) May 2001**  
**Table 3 – Natural Attenuation and Remedial Design Analytical Methods (Rev. 2)**

FIELD PARAMETERS	METHOD/EQUIPMENT	FREQUENCY
Dissolved oxygen (DO)	360.1 <sup>(2)</sup> /Probe/Hach Kit	Quarterly
Redox potential (Eh)	(4) Redox electrode	Quarterly
pH	150.1 <sup>(2)</sup> /pH electrode	Quarterly
Temperature	From conductivity probe	Quarterly
Turbidity	Turbidimeter	Quarterly
Specific Conductance	120.1 <sup>(2)</sup> /Electrical conductivity meter	Quarterly
Ferrous iron	Hach kit; Method 8146	Quarterly
Carbon Dioxide (CO <sub>2</sub> )	Hach kit	Quarterly
Alkalinity (total)	Hach kit	Quarterly
Depth to water <sup>(5)</sup>	Electric tape/Water Level Indicator	Quarterly
LABORATORY PARAMETERS	METHOD	FREQUENCY
Benzene	602 <sup>(1)</sup>	Quarterly
Toluene	602 <sup>(1)</sup>	Quarterly
Ethylbenzene	602 <sup>(1)</sup>	Quarterly
Xylenes	602 <sup>(1)</sup>	Quarterly
DEHP	625 <sup>(1)</sup>	Quarterly
Ammonia Nitrogen (N)	350.3 <sup>(2)</sup>	Quarterly
Nitrate Nitrogen (N)	353.2 or 4110B <sup>(2)(4)</sup>	Quarterly
Sulfate	375.4 or 4110B <sup>(2)(4)</sup>	Quarterly
Heterotrophic Plate Count	9215B <sup>(4)</sup>	Quarterly
Methane	3810 <sup>(3)</sup>	Quarterly
Total Suspended Solids (TSS)	160.2 <sup>(1)</sup>	Quarterly
Total Dissolved Solids(TDS)	160.1 <sup>(1)</sup>	Quarterly
Phosphorus	365.2 <sup>(2)</sup>	Quarterly

**Notes:**

- (1) Federal Register 40 CFR Part 136, Vol. 49, No. 209, Test Parameters for the Analysis of Pollutants.
- (2) USEPA 300/4-79-020 Methods for Chemical Analysis of Water and Waste.
- (3) SW-846, Test Methods for Evaluating Solid Waste, Physical and Chemical Methods, U.S. EPA, 3<sup>rd</sup> Edition, 1986.
- (4) Standard Methods for the Examination of Water and Wastewater, 20<sup>th</sup> Edition, 1998.
- (5) All wells listed on Table 1 will be measured before sampling begins.

**L.E. Carpenter & Company**

**Quality Assurance Project Plan (QAPP) May 2001**

**Table 4 – Natural Attenuation and Remedial Design Analytical Reporting Limits (Rev. 2)**

Analyte	Reporting Limit
Ammonia-N	0.10 mg/L
Nitrate-N	0.1 mg/L
Phosphorus	0.03 mg/L
Sulfate	5 mg/L
Methane	5 µg/L
Benzene	0.25 µg/L
Toluene	0.25 µg/L
Ethylbenzene	0.25 µg/L
Xylenes (total)	0.25 µg/L
DEHP	0.5 µg/L
Total Suspended Solids (TSS)	10 mg/L
Total Dissolved Solids(TDS)	20 mg/L
Heterotrophic Plate Count	1 cfu/mL

**NOTES:**

cfu/mL: Colony forming units/milliliter

mg/L: Milligrams per liter

µg/L: Micrograms per liter

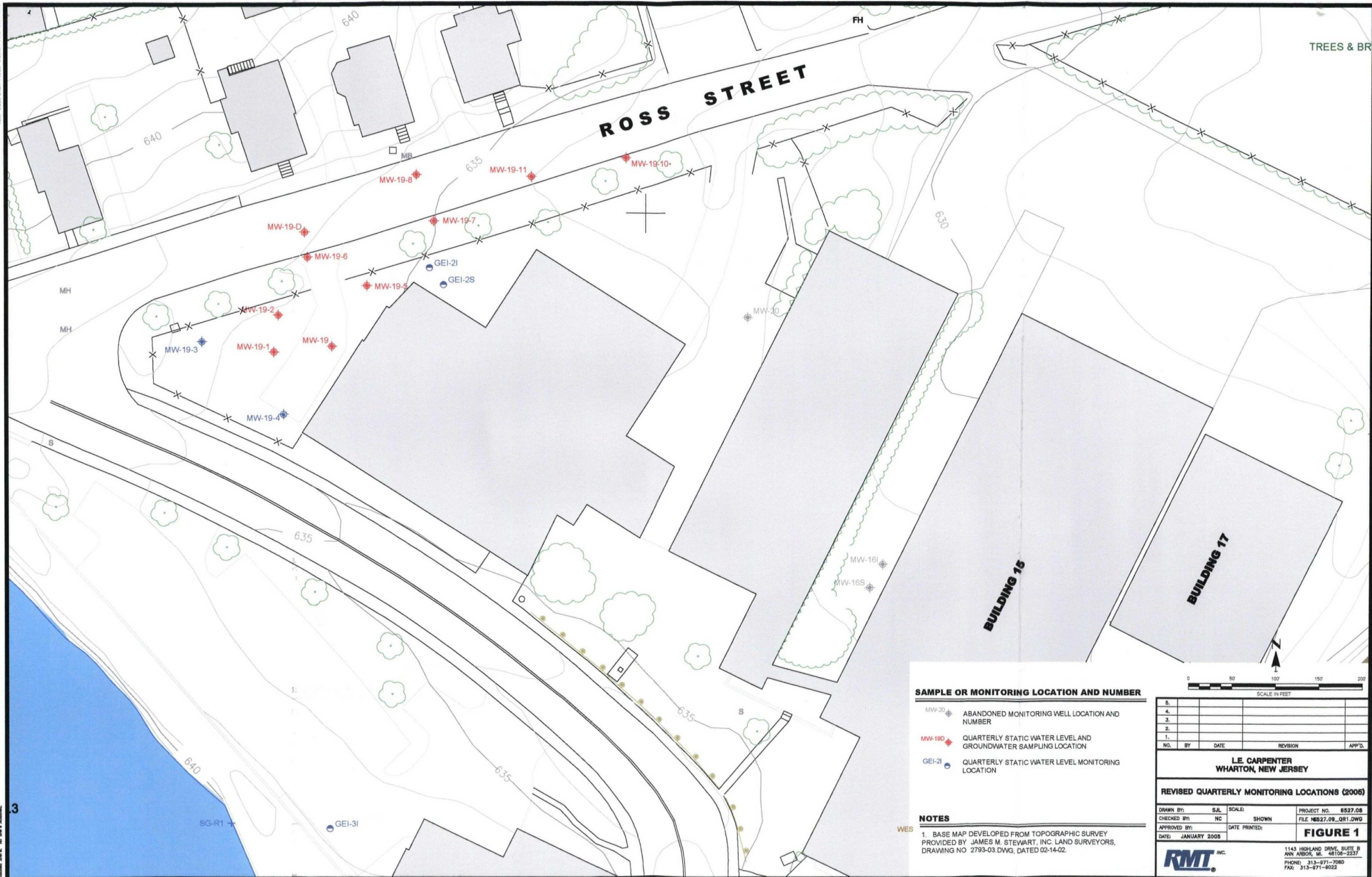
**Figure 1**

**Revised Monitoring Well Locations and**

**Groundwater / Natural Attenuation**

**Sampling Locations (MW19/HS1)**

---





*Integrated  
Environmental  
Solutions*

[www.rmtinc.com](http://www.rmtinc.com)

**Walter Kurzeja**  
Vice President  
Construction Management

**RMT, Inc.**

2025 E. Beltline Avenue SE, Suite 402  
Grand Rapids, MI 49546-7672  
30 Patewood Drive, Suite 100  
Greenville, SC 29615-3535  
[wally.kurzeja@rmtinc.com](mailto:wally.kurzeja@rmtinc.com)  
Office: 616-975-5415, Ext. 1402  
Fax: 616-975-1098  
Greenville Office 864-281-0030  
Cell: 616-633-4247



*Integrated  
Environmental  
Solutions*

[www.rmtinc.com](http://www.rmtinc.com)

**Nakia Addison**  
General Superintendent

**RMT, Inc.**

Patewood Plaza One, Suite 100  
30 Patewood Drive  
Greenville, SC 29615-3535  
[nakia.addison@rmtinc.com](mailto:nakia.addison@rmtinc.com)  
Direct: 864-234-9369  
Office: 864-281-0030  
Fax: 864-281-0288  
Cell: 864-275-1285